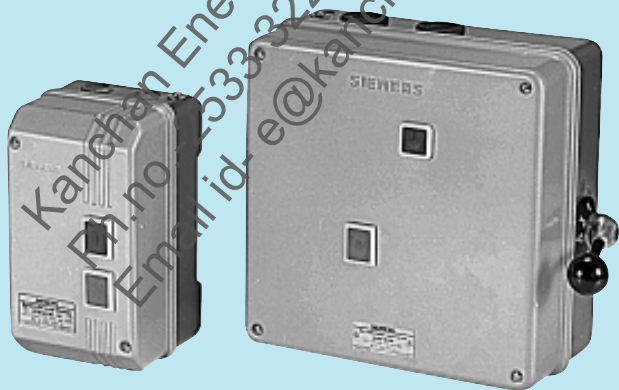


# SIEMENS

Installation, Operation &  
Maintenance Instructions

## DOL Starter 3TW 42

Star-Delta Starter (Handle Operated) 3LW 42



# DOL Starter (Self Reset)

## Selection of Starter

- Refer Table A, B and D for recommended selection of 3TW42 starter.  
Table A : kW/HP Rating, thermal overload relay range & fuse rating.  
Table B : Coil voltage.  
Table D : Maximum full load current for different types of motors.
- Recommended Submersible pump rating 5.5kW / 7.5HP Max.

## Inspection

- Ensure by opening the front cover that the relay range and coil voltage are as per your requirement.
- Ensure that the blue reset knob on overload relay is in 'Auto Reset' position marked with 'A'.

## Installation

- Remove the front cover.
- Fix the starter housing vertically on a rigid surface free from vibrations using 2 screws supplied loose. (fig.1)
- Remove the rubber grommets for incoming and

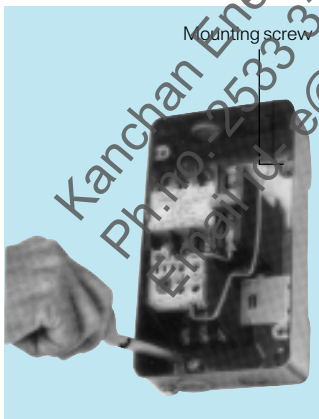


Fig. 1 Fixing of starter on surface

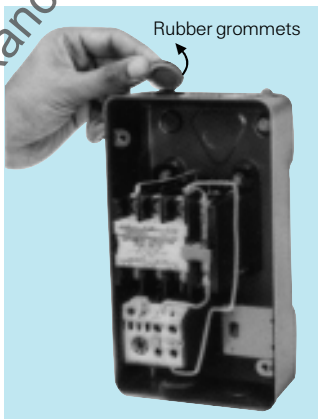


Fig. 2 Removal of rubber grommets

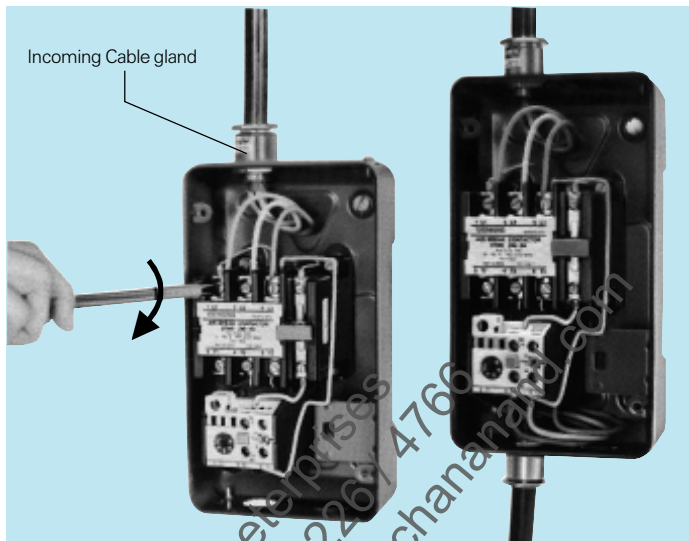


Fig. 3 A.B. Connection of outgoing and incoming cable, using cable gland.

outgoing cable connections.  
(fig. 2)

- Connect incoming and outgoing cables as follows :  
(fig. 3)
- Select correct size of cable from Table A. (max. cable size allowed is 4 mm<sup>2</sup>)
- Remove approx. 10 mm of insulation.
- Pass the cable through proper cable gland to avoid ingress of material.
- Connect the cables and tighten the screws firmly.

(Terminal Screws : M4,  
Stripped Length : 10 mm)

- Set the overload relay scale (fig. 4A-4) using proper screw driver as per the procedure given below :  
(fig. 5)
- Set the relay to rated current mentioned on motor name plate.
- Press green button of the contactor (fig. 4B-7) to start the motor and wait till it reaches to normal speed. Reduce the relay setting till it trips.

Fig. 4 Starter Inside View

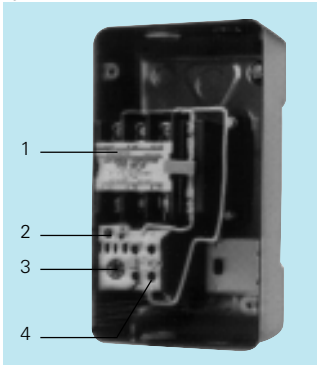


Fig. 4(A)

- 1 Contactor
- 2 Overload Relay
- 3 Relay Dial
- 4 Red knob

- Set the relay at slightly higher value.
  - Allow a reset time of approx. 4 min. and relay resets on its own.
  - Restart the motor. If the relay does not trip, consider the relay as properly set. If it trips, set it at little higher value and recheck.
  - Press the red knob (fig 4A-4) on the overload relay to stop the motor.
- Fix the front cover.

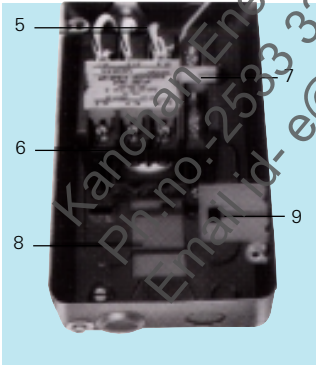


Fig. 4(B)

- 5 Contactor incoming terminal screws
- 6 Contactor outgoing terminal screws
- 7 Contactor actuating green button
- 8 Relay mounting bracket with slot

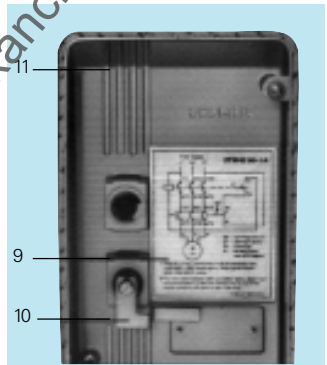


Fig. 4(C)

- 9 Wiring diag. label
- 10 Link
- 11 Gasket

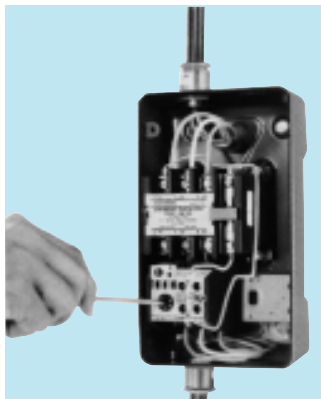


Fig. 5 Setting the relay dial



Fig. 6 Starter in closed position

1. 'ON' push button (Green)
2. 'OFF' Push button (Red)
3. Cover fixing screws
4. Housing
5. Cover
6. Name Plate

## Operation

### ● ON/OFF Operation

- Switch 'ON' the starter by pressing the green push button (marked 'I') (Fig. 6-1) on the starter cover.
- Switch 'OFF' the starter by pressing the red push button (marked 'O') (fig. 6-2) on the starter cover.

### ● Reset Operation

- If the overload relay trips, it resets automatically.  
(Allow a reset time of approx. 4 min.)
- It is recommended that the DOL Starter (Self reset type) is not to be used in applications involving maintained 'ON' command. In such applications hand reset type of starter is recommended.

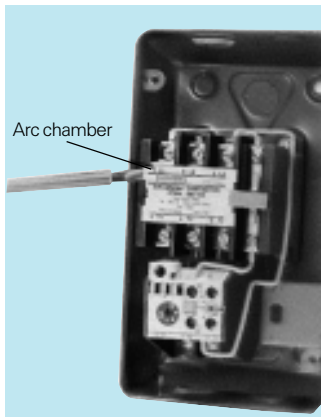


Fig. 7 Removal of arc chamber

## Maintenance

**Switch off the starter and disconnect the main supply by switching off the main switch before doing any maintenance.**

- **Replacement of Arc Chamber:**

- Remove the existing arc chamber as shown in Fig. 7.
- Replace it by a new arc chamber referring the Spares list.
- Ensure that the arc chamber is flush with the contactor body.

- **Replacement of Overload Relay (Fig. 8)**

**Removal**

- Disconnect the wires connected to the relay terminals.
- Loosen the outgoing terminal screws of the contactor (Fig. 4B-6)
- Lift the overload relay vertically upwards to disengage its hook (fig. 9-1) from the slot of the bracket (fig. 4B-8) welded on the starter body.

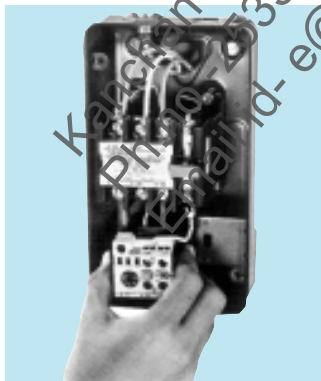


Fig. 8 Replacement of overload relay

- iv. Pull the overload relay away from contactor and in outward direction.
- Refixing
  - i. Select the overload relay of proper range by referring to table A and Spares list. Ensure it's blue knob in 'Auto reset' position marked with 'A'.
  - ii. Connect the relay terminals (L1 L2 L3) to the contactor terminals (T1 T2 T3).
  - iii. Ensure that the relay hook (fig. 9-1) is engaged in the slot of the bracket (fig. 9-2) welded to the housing and slide the relay inwards till the cover is flush with contactor ribs. (fig. 9.3)
  - iv. Tighten the contactor terminal screws.
  - v. Reconnect the disconnected relay wires and check the correctness of the starter wiring as shown on the inside of the front cover.

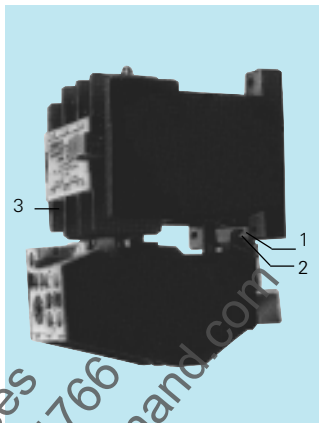


Fig. 9-1 Contactor - Birelay Connection  
 1. Hook for relay engagement  
 2. Relay mounting bracket  
 3. Contactor ribs flush with relay edge.

- **Replacement of main contacts:** (fig. 11)

- Remove the Arc Chamber. (Fig. 7)
- Remove and inspect the contacts. (fig. 10)
- When contact tips get eroded and base material is seen, refer Spares list to replace contacts.
- Put back the Arc Chamber.

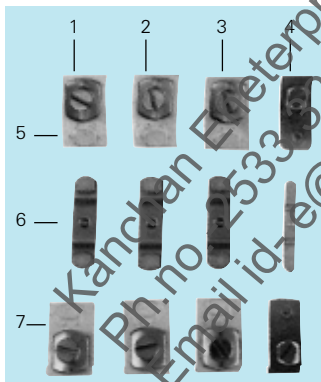


Fig. 10 Fixed/moving, main/auxiliary contacts inspection.

- 1, 2, 3 : Main contacts
- 4 : Auxiliary contacts
- 5, 7 : Fixed contacts
- 6 : Moving contacts

- **Replacement of Coil:** (fig. 12)

- Disconnect all the wires connected to the contactor. Disconnect the relay from the contactor and remove the contactor from the housing by loosening the mounting screws.
- Turn the contactor upside down, unscrew the bottom cover and remove it.
- Ensure that the new coil is of proper voltage. (Table B)
- Ensure all springs are placed at proper location.
- Put back the bottom cover. Ensure that the liner (fig. 12-2) is properly put. Fix the contactor in the housing, connect the relay and reconnect the disconnected wires and ensure that the connections are proper as per circuit diagram shown on the inside of front cover.



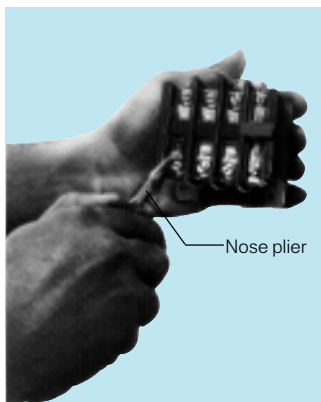


Fig. 11(A) Replacement of moving contacts

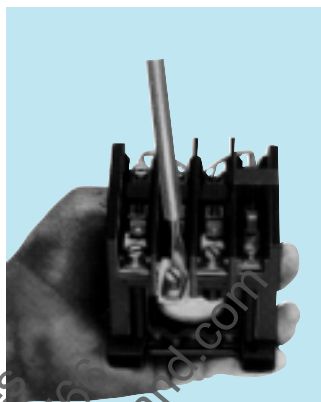


Fig. 11(B) Replacement of fixed contacts

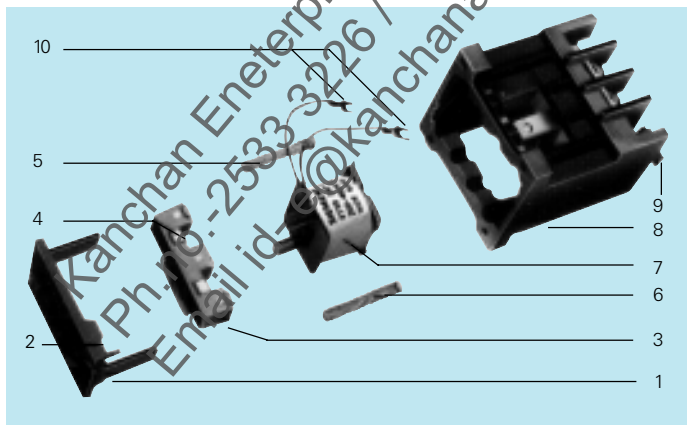


Fig. 12 Replacement of Coil

- 1 : Bottom Cover
- 2 : Liner for shock absorption
- 3 : Fixed Magnet
- 4 : Bracket Assembly
- 5 : Return Spring

- 6 : Return Spring
- 7 : Coil
- 8 : Contactor housing along with moving magnet
- 9 : Aux. Contact
- 10 : Coil terminals

# Star-Delta Starter (Handle Operated)

## Selection of Starter

- Refer Table 'A' for recommended selection of 3LW42 starter, thermal overload relay range & fuse rating.  
Ref. table 'B' for Coil voltage.
- Recommended submersible pump rating 8kW/11HP max.

## Inspection

- Ensure by opening the front cover that the relay range and coil voltage are as per your requirement.

## Installation

- Remove the front cover (fig. 13)

- Fixing of the handle:
  - Place the dial on to the shaft of the switch such that the 'O' mark on the dial aligns with the embossed mark 'I' on the housing. Ref. fig. 14.
  - Engage the ball handle in such a way that the ball handle points towards you. Ref. fig. 14
- Fix the starter housing vertically on a rigid surface free from vibrations using 4 screws supplied loose with the starter
- Remove the rubber grommets for incoming and outgoing cable connections. (Ref. fig. 2)

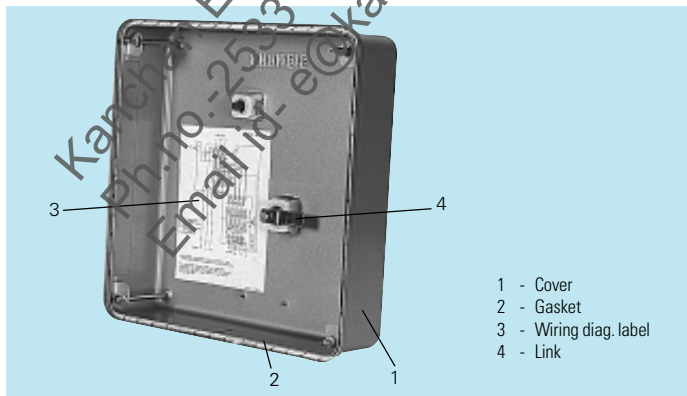


Fig. 13

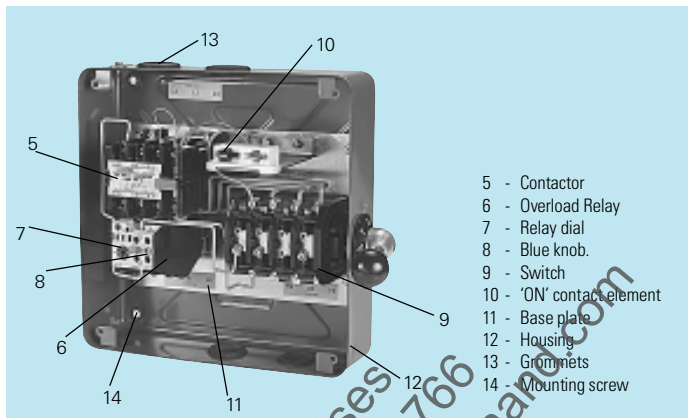


Fig. 13a

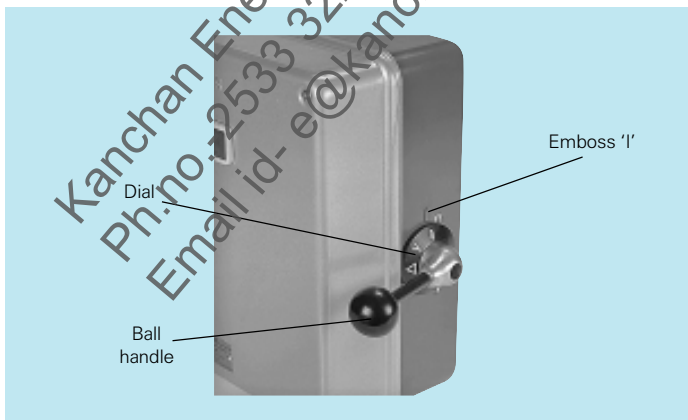


Fig. 14

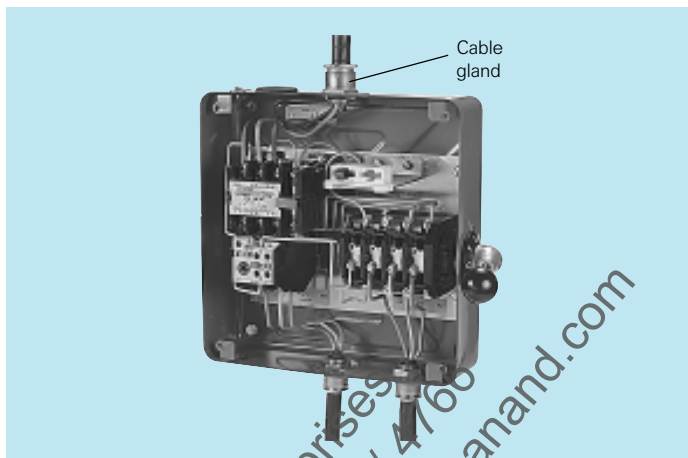


Fig. 15: Connection of incoming and outgoing cable, using cable glands.

- Connect incoming and outgoing cables as follows (fig. 15):
  - displacement from vertical plane =  $\pm 15^\circ$ .
- Use proper cable glands to ensure dust proofing. For conduit entry use packed washers. Select correct size of cable from table A (Max. cable size allowed is 4mm<sup>2</sup>).
- Connect line and motor leads exactly as per the wiring diagram pasted inside the cover of the starter.
 

Terminal Screws : M4  
Stripped Length = 10 mm.
- Maximum permissible

### Commissioning

- Setting of 'Auto / Hand Reset' mode (Ref. fig. 13):
  - In the delivered condition, the relay is set in H=Hand (manual) resetting mode. To change from H=Hand (manual) resetting to A=Automatic mode, press and turn the BLUE button on the relay counter clockwise from H to A.
- Overload relay setting:

- Set overload relay to 0.58 times the rated motor current as appearing on the nameplate of the motor.
- For starting motor, follow the following procedure:
- Move the switch handle from 'O' (OFF) to 'Y' (STAR) position.
- Press the 'ON' button (safety push button) marked 'I'.
- Hold the 'ON' button for 6 to 8 seconds approx. till the motor comes to almost rated speed (This is indicated when the motor hum reaches a steady pitch).
- Now move the switch handle from 'Y' to 'D' (DELTA) position.
- Release safety push button leaving the switch handle in 'D' position.
- For stopping the motor, bring the switch handle to 'O' position.
- Gradually reduce the relay setting till it trips.
- Set the relay at slightly higher value.
- Allow a reset time of approx. 4 min. and reset the relay (If set in HR mode) or relay

resets on it's own (if set in SR mode).

- Restart the motor after some time. If the relay does not trip, consider it to be properly set. If it trips, set at a little higher value and recheck.

## Operation

### ● ON/OFF Operation (Ref. fig. 16)

- Move the switch handle from 'O' (OFF) to 'Y' (STAR) position.
- Press the green button marked 'I' (ON) and hold it by left hand.
- Caution: If you leave the 'I' button now, the motor will stop!
- Wait (for approximately 6-8 secs) till the motor comes to almost rated speed. (This is indicated when the motor hum reaches a steady pitch).
- Keeping the safety button pressed, move the switch handle from 'Y' to 'D' (DELTA) position.

Release the safety button, leaving the switch handle in 'D' position.

- For stopping the motor, bring back the switch handle to "O" position.

### ● Reset Operation

- When the relay is set in 'Manual Reset' mode :

If the overload relay trips, before doing the next 'ON' operation, it needs to be reset. The Reset\* operation is done by pressing the 'R' blue button on the starter cover.

- When the relay is set in

'Auto Reset' mode.

If the overload relay trips, it resets\* automatically.

**(\*Allow a reset time of approx. 4 min.)**

### ● Maintenance

Switch off the starter and disconnect the main switch before doing any maintenance. The various maintenance tips are covered under the section maintenance on the DOL starter of this instruction manual.

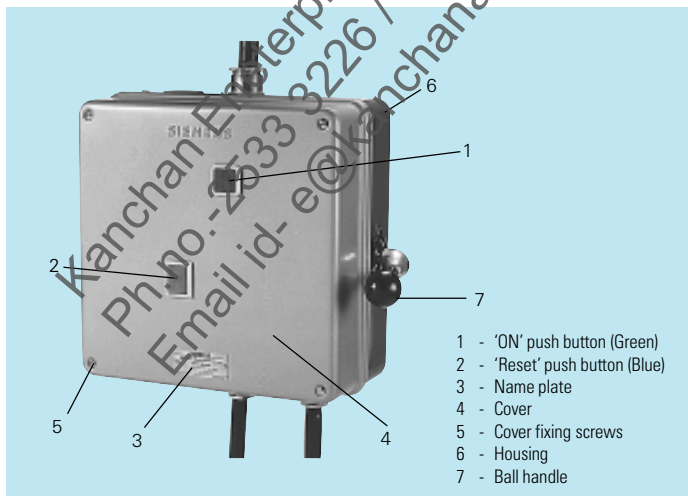


Fig. 16: Starter in closed position

**Table A: Selection Table****1) DOL Starter**

Motor Rating at 415V 3ph, 50Hz		Type	Relay Range 3UW50	Back-up Fuse Rating		Cu Cable (mm <sup>2</sup> ) Size
HP	kW			HRC type 3NA1	Rewirable	
0.33	0.25	3TW42 90-1A * 64	0.63 - 1	4 A	36 SWG	1
0.75	0.55	3TW42 90-1A * 66	1 - 1.6	6 A	34 SWG	1
1	0.75	3TW42 90-1A * 68	1.6 - 2.5	6 A	27 SWG	1
1.5	1.1	3TW42 90-1A * 69	2 - 3.2	10 A	26 SWG	1
2	1.5	3TW42 90-1A * 71	3.2 - 5	16 A	25 SWG	1
3	2.2	3TW42 90-1A * 72	4 - 6.3	16 A	24 SWG	1.5
5	3.7	3TW42 90-1A * 74	6.3 - 10	25 A	21 SWG	1.5
—	—	3TW42 90-1A * 75	8 - 12.5	25 A	19 SWG	1.5
7.5	5.5	3TW42 90-1A * 77	10 - 16	32 A	18 SWG	2.5
10	7.5	3TW42 90-1A * 78	12.5 - 20	32 A	18 SWG	4

**2) Star - Delta Starter (Manual Operated)**

Motor Rating at 415V 3ph, 50Hz		Type	Relay Range 3UW50 .....A	Back-up Fuse Rating	Copper Cable (mm) <sup>2</sup> Size	
HP	kW				Incoming from supply	Outgoing to motor
5	3.7	3LW42 90-0A * 72	4 - 6.3	10 A	1.5	1
10	7.5	3LW42 90-0A * 74	6.3 - 10	20 A	2.5	1.5
12.5	9.3	3LW42 90-0A * 75	8 - 12.5	25 A	2.5	2.5
15	11	3LW42 90-0A * 77	10 - 16	32 A	4.0	2.5

\* Code for Coil Voltage from Table B

## Spares List

Sr. No.	Description	Order No.
1	Contactor	3TW0 290-0A * 51 (Refer Table B for*)
2	Birelay	3UW50 02 - ** (Refer Table C for **)
3	Main contact kit (Each set comprises of 6 Fixed Contacts and 3 Moving Contacts)	3TX0 200-0YA0
4	Contact Kit - Single Pole	3TX0 200-0YA1
5	Coil	3TX 203-0Y*6 (Refer Table B for *)
6	Cover (Arc chamber)	3TX0 202-0YA0
7	Aux. fixed contact	3TX0 200-1YB0
8	Aux. moving contact	3TX0 200-1YC0
9	'ON' SPA	3TX0 204-1YA0
10	'OFF' SPA	3TX0 204-1YB0
11	'Reset' SPA	3TX0 204 - 1YR0
12	Contact Holder	3TX0 200-0YD0
13	'ON/OFF' contact Element	3SX1 551 - 1YA
14	Switch for HSD starter	3LA0 204 - 4YB

**Table C**

Relay Range	Code for
0.63 - 1	0A
1 - 1.6	1A
1.6 - 2.5	1C
2 - 3.2	1D
3.2 - 5	1F
4 - 6.3	1G
6.3 - 10	1J
8 - 12.5	1K
10 - 16	2A
12.5 - 20	2B

**Table B**

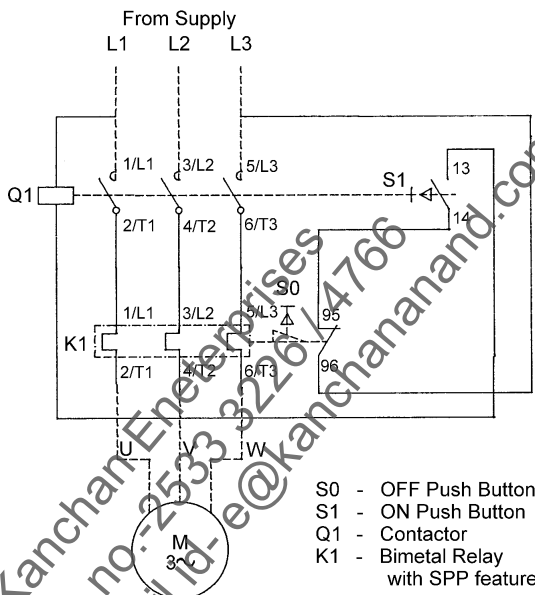
Voltage	Code
200-400 V	B
130-230V	P
415 V	W
220 V	M



## Wiring Diagrams:

### RAJA Direct-On-Line Starter

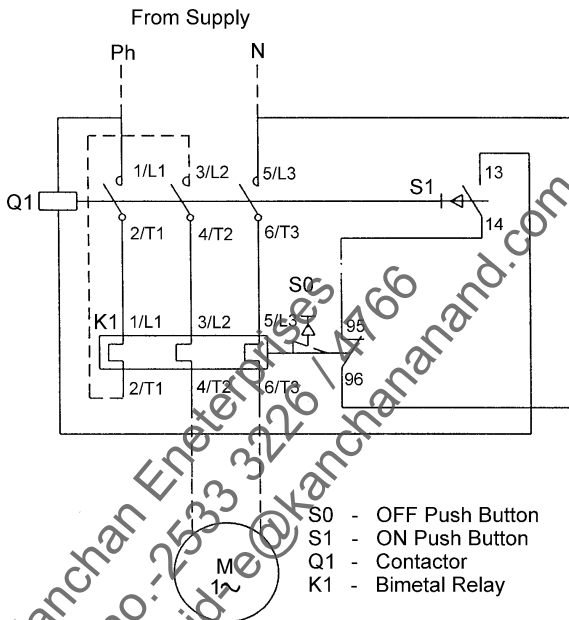
3TW42 90-1A



- Diagram shows connections made for contactor coils rated 200v - 400V (wide-band), 415V (320-455V), 50Hz. 440V (330V-485V), 50Hz.
- For coils rated between 220V and 250V 50Hz, disconnect the wire between L3-96 and connect the neutral of the supply system to the terminal 96 of the relay.

# **RAJA Direct-On-Line Starter** (for Single Phase connection)

**3TW42 90-1A**



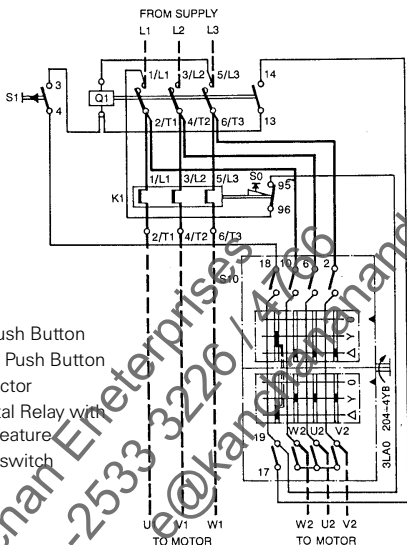
- Wiring Diagram for Single-Phase Motors

Note :

Connect 3/L2 to 2/T1 by cable of suitable size. (max 4 mm<sup>2</sup>)

## RAJA Star-Delta Starter

3LW42 90-0A

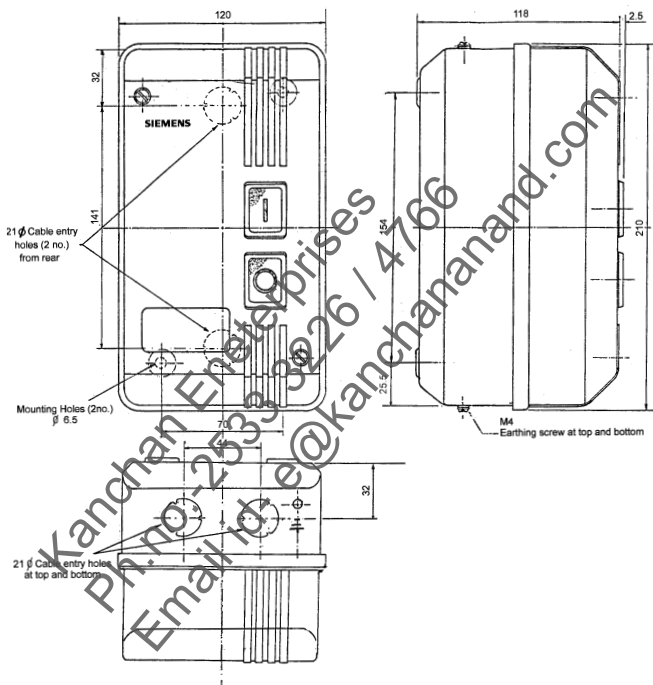


- S1 = ON Push Button  
S0 = Reset Push Button  
Q1 = Contactor  
K1 = Bimetal Relay with SPP Feature  
S10 = 3LA0 switch

- Diagram shows connections made for contactor coils rated 200v - 400V (wide-band), 415V (320-455V), 50Hz., 440V (330V-485V), 50Hz.
- For coils rated between 220V and 250V 50Hz, disconnect the wire between 1/L1-96 and connect the neutral of the supply system to the terminal 96 of the relay.

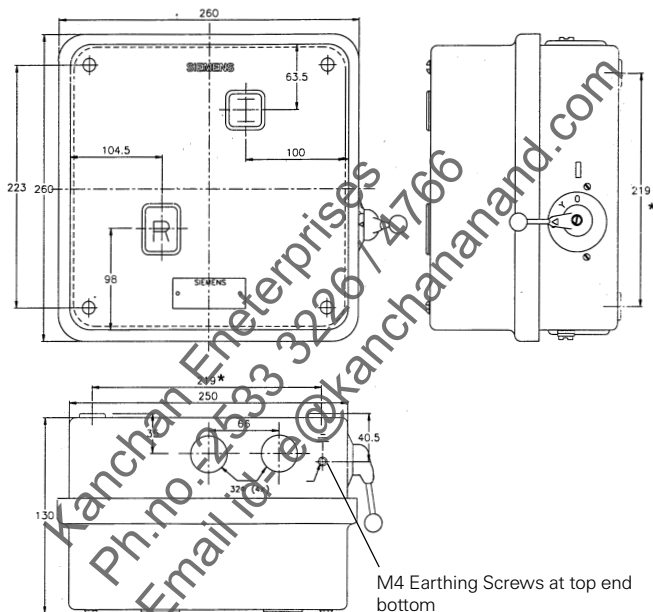
## Dimensional Drawings:

### RAJA Direct-On-Line Starter



\* Mounting dimensions 154 x 70

# **RAJA Star-Delta Starter** (Handle Operated)



\* Mounting dimensions 219 x 219  
Use M4 screws for mounting

**Table D**

Motor Rating		Max. Full Load Current (Amp)		
		3 Ph, 415V, 4P Squirrel Cage IS 8789 : 1996 Table 4	3 Ph, 415V, 2P Submersible Motor IS 9283 : 1995 Table 2	1 Ph, 240V CSIR or Split-Phase IS 996 : 1979 Table 9
HP	kW			
0.33	0.25	–	–	3.8
0.5	0.37	1.4	–	6
0.75	0.55	1.7	–	7
1	0.75	2.2	–	–
1.5	1.1	2.9	3.25	13
2	1.5	3.8	4.5	18
3	2.2	5.1	6.5	–
5	3.7	8.1	10	–
7.5	5.5	11.4	14.5	–
10	7.5	15.4	19.5	–
12.5	9.3	19.5	25	–
15	11	23	29	–
20	15	32	39	–
25	18.5	38.5	–	–

Note : The above table gives the max. full load current for various motors commonly used. It is recommended that the above table be referred to in conjunction with motor name plate data, before selecting the starter with appropriate relay range.

**Notes:**

Kanchan Eneterprises  
Ph.no.-2533 3226 / 4766  
Email id- e@kanchananand.com

## Electrician registration form

I have installed starter Type No : 3TW4290-1A \_\_\_\_\_ /

3LW4290-0A \_\_\_\_\_

at village \_\_\_\_\_ district \_\_\_\_\_

State \_\_\_\_\_

Motor HP \_\_\_\_\_ Type of Motor \_\_\_\_\_

Brand \_\_\_\_\_

Please register my name for the future updates about your Motor  
Starter range

My Name : \_\_\_\_\_

Shop's Name : \_\_\_\_\_

Address : \_\_\_\_\_

\_\_\_\_\_ Pin : \_\_\_\_\_

STD Code : \_\_\_\_\_ Tel : \_\_\_\_\_ Fax : \_\_\_\_\_

Date of Purchase : \_\_\_\_\_

Date of Installation : \_\_\_\_\_

Name & address of Siemens Authorised dealer  
or Siemens Starter House

Name & address of Sub-dealer



## Reply Card

Please  
Affix  
Stamp

Kanchan Enterprises  
Ph.no.:-2533 3226/4766  
Email id. e@kanchanand.com

To

**Siemens Ltd.**

(Standard Products Division)

Thane Belapur Marg,

Kalwe, Thane - 400601.

Kanchan Eneterprises  
Ph.no.-2533 3226 / 4766  
Email id- e@kanchananand.com